

REMARKS

In response to the First Office Action, dated December 11, 2003, Applicants have modified Claims 1-3 in this Amendment B to more clearly indicate the novelty of their invention. More specifically, Applicant's have added language which further specifies that the switch replaces all of at least one type of pulses from a pulse generator, or alternatively, that all drive pulses are replaced as specified. Applicant's invention is directed to a novel approach to the horizontal read-out of a solid state image pickup-device.

Applicants respectfully point out that *Endo et al.* (U.S. Patent No. 4,875,101) fails to teach or suggest Applicant's invention as now claimed. *Endo* is directed to a device which is used to effectively discharge excess charge in the *vertical* shift register of an image pickup device and thereby improve its dynamic range by the use of a horizontal Drain Register (SD) disposed on the opposite side of said horizontal charge transfer register. (See Figure 2 and Claim 1). *Endo* provides a second embodiment, similar to the first, except with the further addition of switch devices to switch between an enhanced quick-drain mode that implements DC offsets to two of the clock pulses and constant DC values to the other two clock pulses, and the normal mode in which all four clock pulses are driven by the pulse generator. (See Column 9 line 26 – Column 10 line 11). *Endo* asserts that this configuration allows a quicker sweep-out of the excess charges in the vertical shift registers. (See Column 11 lines 5-9). At no point does *Endo* teach or suggest Applicant's claimed invention, which would require

Endo's novel use of their horizontal read-out signals $\Phi H1$, $\Phi H2$, ΦBg , and the addition of several signals disclosed by Applicants but not by *Endo*. (See Figure 2).

Applicant's invention, conversely, is directed to the *horizontal* shift register signals. The switch(es) can be implemented on any one or more of the signals involved in the read-out of the horizontal shift register. As disclosed in Figure 1 and Page 7, 1st full paragraph, these could include the read-out-gate pulse (ROG), the horizontal driving pulses ($\Phi 1$ and $\Phi 2$), the charge transfer pulse (LH), or the Reset pulse (RS). For example, register driving pulses $\Phi 1$ and $\Phi 2$ are input into switches SW1 and SW2 in Figure 1. An externally applied signal then determines whether to keep switches SW1 and SW2 closed, thereby applying the pulse-generator signal to the horizontal shift register, or whether to open switches SW1 and SW2, thereby replacing all of the drive pulses $\Phi 1$ and $\Phi 2$ inputs and allowing $\Phi 1'$ and $\Phi 2'$ to control the read-out speed of the device. (See Figure 1 and the bottom of Page 10 of the disclosure).

Applicants respectfully request reconsideration of Examiner's U.S.C. §102(b) rejection of Claim 3 as being anticipated by *Endo et al.* Applicants have amended Claim 3 to more clearly indicate the novelty of their invention. More specifically, Applicants have amended the claim to point out the novel subject matter. In this mode, for example, the user can choose whether to read out a color image by applying the input clock pulse to all four transfer registers by closing switches SW1 and SW2, or to read out a black and white image at high speed by only attaching the load of one horizontal transfer register to the clock pulse by opening switches SW1 and SW2. (See the second and third paragraph of page 16.)

Applicants specifically state in Claim 3 that the invention involves the transfer of charge stored in each *row* of the device during the horizontal charge read-out, whereas *Endo* discloses and claims the application of pulses to discharge the excess charge via the *vertical transfer registers*. Applicants therefore assert that their Claim 3 is distinguishable and inventive over Examiner's claimed prior art, and should therefore be allowable.

Applicants respectfully request reconsideration of Examiner's USC §103(a) rejection of Claims 1-3 as unpatentable over *Endo et al.* The Examiner asserts the §103 rejection instead of a §102 rejection because "*Endo* fails to disclose that the pixels are disposed strictly in a row, rather than disposed in an array of rows and columns." Further, Examiner states that "one skilled in the art would have been motivated to provide the plurality of pixels strictly in a row rather than an array." However, Applicant's invention is directed to a novel method of reading out a row of pixel data transferred to a horizontal shift-register, wherein said pixel data most likely is generated *from an array of pixels*. The inventions in both *Endo* and Applicant's disclosure are directed to improvements in CCD imaging *arrays*. While the invention in *Endo* is directed to a method of discharging the device by application of pulses to the *vertical shift registers*, Applicant's invention is directed to an improved method of reading out the *horizontal shift register(s)* by the addition of a switch controllable by an external source, to allow different clock pulses to be applied to said horizontal shift register. As a result, there is no need to design additional circuitry to allow for modified handling of the pulse generation to affect changing the clock speed and, for example, dealing with resulting clock skew.


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Based upon the above cited distinctions, Applicants assert that *Endo* fails to teach or suggest Applicant's currently claimed invention, and all of the Examiners rejections should therefore be withdrawn.

Examiner's remaining references cited but not relied upon, considered either alone or in combination, also fail to teach applicant's currently claimed invention. In light of the foregoing, Applicants respectfully submit that all claims now stand in condition for allowance.

Respectfully submitted,

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